

Notice of Allowability

Application No.

09/423,126

Examiner

Russell Kallis

Applicant(s)

BUCHTER-LARSEN ET AL.

Art Unit

1638

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed 11/24/2003.
2. ☒ The allowed claim(s) is/are 40-66 (renumbered claims 1-27).
3. ☐ The drawings filed on _____ are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date <u>3/01/04</u> . |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date <u>6/03,11/03,3/01</u> | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

In the specification:

The first line of the specification, delete "This application is a 371 of PCT application PCT/IB/00708 filed May 06, 1998 designating the U.S., which claims priority from Great Britain Patent Application 9709161.5 filed May 06, 1997.", and insert, --This application is a continuation of PCT application PCT/IB/00708 filed May 06, 1998 designating the U.S., which claims priority from Great Britain Patent Application 9709161.5 filed May 06, 1997.—

In the abstract:

A process for preparing an anti-oxidant in a plant is described. [The process comprises preparing a medium that comprises an anti-oxidant and at least one other component.] The process comprises transforming a plant with a nucleic acid encoding glucan lyase thereby producing the anti-oxidant anhydrofructose *in situ*. [preparing *in situ* in the medium the anti-oxidant. The anti-oxidant is prepared from either a glucan by use of recombinant DNA techniques and/or by use of recombinant glucan lyase.]

In the claims:

40. (Amended) A method for increasing anhydrofructose levels [*in situ*] in a plant or part thereof, the method comprising [expressing recombinant] introducing a nucleic acid encoding α -1,4-glucan lyase in the plant or part thereof, wherein the α -1,4-glucan lyase acts on a glucan substrate present in the plant or part thereof to yield increased levels of anhydrofructose in the plant or part thereof, wherein the α -1,4-glucan lyase comprises an amino acid sequence having at least 75% sequence identity to SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5 or SEQ ID NO: 6.

41. (Amended) The method of Claim 40, [wherein the plant or part thereof is used in the preparation of] further comprising preparing from said plant or part thereof a foodstuff [or is a foodstuff].

42. (Amended) The method of Claim 40, wherein the α -1,4-glucan lyase [has any one of the sequences shown as SEQ ID NOs:1-6] comprises SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5 or SEQ ID NO: 6.

43. (Amended) The method of Claim 40, wherein the nucleic acid encoding α -1,4-glucan lyase [is encoded by any one of the sequences shown as SEQ ID Nos:7-12] comprises SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 10, SEQ ID NO: 11 or SEQ ID NO: 12.

44. (Amended) The method of Claim 40, wherein the [glucan lyase is encoded by] nucleic acid comprises SEQ ID NO: 7.

In Claim 45, delete "glucan lyase" and insert -- α -1,4-glucan lyase--.

In Claim 46, delete "glucan lyase" and insert -- α -1,4-glucan lyase--.

In Claim 47, delete "glucan lyase" and insert -- α -1,4-glucan lyase--.

In Claim 49, delete “is all or part of a grape” and insert --is grape--.

In Claim 50, after “is” delete “a”.

54. (Amended) A method of preparing a foodstuff comprising anhydrofructose, said method comprising the steps of:

- a) [expressing recombinant] introducing a nucleic acid encoding α -1,4-glucan lyase
[in situ] in a plant or part thereof, wherein the anhydrofructose acts on a glucan
substrate present in the plant or part thereof to yield anhydrofructose in the plant
or part thereof; wherein the α -1,4-glucan lyase comprises an amino acid sequence
having at least 75% sequence identity to SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID
NO: 3, SEQ ID NO: 4, SEQ ID NO: 5 or SEQ ID NO: 6; and
- b) preparing a foodstuff comprising the plant or part thereof, whereby the food stuff
comprises the anhydrofructose yielded in step a).

55. (Amended) The method of Claim 54, wherein the α -1,4-glucan lyase [has any one of
the sequences shown as SEQ ID NOs:1-6] comprises SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID
NO: 3, SEQ ID NO: 4, SEQ ID NO: 5 or SEQ ID NO: 6.

56. (Amended) The method of Claim 54, wherein the nucleic acid encoding α -1,4-glucan
lyase [is encoded by any one of the sequences shown as SEQ ID NOs:7-12] comprises SEQ ID
NO: 7, SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 10, SEQ ID NO: 11 or SEQ ID NO: 12.

57. (Amended) The method of Claim 54, wherein the [glucan lyase is encoded by]
nucleic acid comprises SEQ ID NO: 7.

In Claim 58, delete “glucan lyase” and insert -- α -1,4-glucan lyase--.

In Claim 59, delete “glucan lyase” and insert -- α -1,4-glucan lyase--.

In Claim 60, delete “glucan lyase” and insert -- α -1,4-glucan lyase--.

In Claim 62, delete “is all or part of a grape” and insert --is grape--.

In Claim 63, after “is” delete “a”.

The following is an examiner’s statement of reasons for allowance: SEQ ID NOs: 7 and 8 of the instant application encode α -1,4-glucan lyase from a fungally infected algal source (*Gracilariopsis*) SEQ ID NOs: 1 and 2 are described in WO95/10616 and WO 95/10618 as SEQ ID NOs: 3 and 4 encoding SEQ ID NOs: 7 and 8. SEQ ID NOs: 9 and 10 of the instant application encode fungal α -1,4-glucan lyase of SEQ ID NO: 3 from *Morcella costata* and SEQ ID NO: 4 from *Morchella vulgaris* are described in WO 95/10616 as SEQ ID NOs: 7 and 8 encoding SEQ ID NOs: 5 and 6. SEQ ID NOs: 5 and 6 of the instant application encode α -1,4-glucan lyase of SEQ ID NOs: 11 and 12 from uninfected *Gracilariopsis* are described in UK application GB 2294048 as SEQ ID NOs: 1 and 2 encoding SEQ ID NOs: 3 and 4.

The protein sequences for α -1,4-glucan lyase were grouped by source and identity relationship. The four α -1,4-glucan lyases of SEQ ID NO: 1, 2, 5 and 6 (Group I) isolated from fungally infected and uninfected *Gracilariopsis* have at least 75% sequence identity and the two α -1,4-glucan lyases of SEQ ID NO: 3 and 4 (Group II) isolated from fungal sources have about 85% sequence identity.

The enzymatic activity of the expression products of the DNA sequences of Group I (SEQ ID NO: 7 and 8) and Group II (SEQ ID NO: 9) when isolated and assayed as recombinant expression products showed α -1,4-glucan lyase activity as described in WO 95/10616 on pages 52-56 and 68-69 respectively.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell Kallis whose telephone number is (571) 272-0798. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amy Nelson can be reached on (571) 272-0804. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Russell Kallis Ph.D.
March 1, 2004



AMY J. NELSON, PH.D
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600